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CLAIMS

1. Electromechanical microstructure (1) comprising a first part known as a mechanical part (102) formed in a first electrically conductive material, and which comprises on the one hand a zone (104) deformable in an elastic manner having a thickness value and an exposed surface (2), and on the other hand a first organic film (4) having a thickness, present on the whole of the exposed surface (2) of said deformable zone 104, characterised in that the first film (4) consists of an organic film bonded in a covalent manner to the exposed surface (2) of the deformable zone (104) and in that it is formed from an electro-initiated reaction.

2. Electromechanical microstructure (1) according to claim 1, characterised in that the thickness of the first film (4) is such that the elastic response of the deformable zone (104) equipped with the first film (4) does not change by more than 5% compared to the response of the bare deformable zone (104) or in that the thickness of the first film (4) is less than ten times the thickness of the deformable zone (104).

3. Electromechanical microstructure (1) according to one of claims 1 or 2, characterised in that the thickness of the first film (4) is such that the elastic response of the deformable zone (104) equipped with the first film (4) does not change by more than 1%.

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4. Electromechanical microstructure (1) according to one of claims 1 to 3, characterised in that the level of cover of the exposed surface (2) by the first film (4) is greater than 60%.

5. Electromechanical microstructure (1) according to claim 4, characterised in that the level of cover of the exposed surface (2) by the first film (4) is greater than 90%.

6. Electromechanical microstructure (1) according to claim 3, characterised in that the first film (4) consists of a layer of a molecule of fixed length.

7. Electromechanical microstructure (1) according to one of claims 1 to 6, characterised in that it comprises at the surface of the mechanical part (102), an annular zone (5), surrounding the exposed surface (2), having itself a surface (6) and formed in a second electrically conductive material, different in the sense of the electro-initiated reaction from the first material of the mechanical part (102), and in that a second organic film (7) is present on the surface 6 of said annular zone (5), this second film (7) being a film formed in a material that may be deposited from an electro-initiated chemical reaction.

8. Electromechanical microstructure (1) according to one of claims 1 to 6, characterised in that the first material constituting the mechanical part (102) is a doped semi-conductor and in that it comprises at the surface of the mechanical part (102), an annular zone 5, surrounding the exposed surface (2), having itself a surface (6) and formed in a second

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material formed by doping of type opposite to that of the first material and in that a second organic film (7) is present on the surface (6) of said annular zone (5), said second film (7) being a film formed in a material that may be deposited from an electro-initiated chemical reaction.

9. Electromechanical microstructure (1) according to one of claims 7 to 8, characterised in that the mechanical part (102) comprises one or several contact points (8) in a position exterior to the annular zone (5).

10. Electromechanical microstructure (1) according to claim 7, characterised in that the mechanical part (102) comprises one or several first contact points (8) having a surface (9) formed in a third material, different in the sense of the electro-initiated reaction from the first and second materials, in a position exterior to the annular zone (5) and in that a third organic film (10) is present on the surface (9) of the first contact points (8), said third film (10) being a film formed in a material that may be deposited from an electro-initiated chemical reaction.

11. Electromechanical microstructure (1) according to claim 8, characterised in that the mechanical part (102) comprises one or several first contact points (8) having a surface (9) formed in a third material, different in the sense of the electro-initiated reaction from the first material, in a position exterior to the annular zone (5) and in that a third organic film (10) is present on the surface (9) of the first contact points (8), this third film (10)

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being a film formed in a material that may be deposited from an electro-initiated chemical reaction.

12. Electromechanical microstructure (1) according to one of claims 10 to 11, characterised in that it comprises a second electrically conductive part (11), electrically insulated from and mechanically integral with the mechanical part (102) comprising one or several second contact points (12) having a surface (13) formed in a material different in the sense of the electro-initiated reaction from the material constituting the second part (11) and in that a fourth organic film (14) is present on the surface (13) of the second contact points (12), said fourth film (14) being a film formed in a material that may be deposited from an electro-initiated chemical reaction.

13. Electromechanical microstructure (1) according to claim 12, characterised in that it comprises a third part (15), mechanically integral with the first and second mechanical parts (102) and (11), electrically insulated from the first mechanical part (102), formed in an electrically conductive material and in that the second part and the third part are electrically connected.

14. Electromechanical microstructure (1) according to claim 12, characterised in that the first part (102) consists of a first layer of silicon, and in that the first and second parts (102) and (11) are integral with a same insulating layer (16).

15. Electromechanical microstructure (1) according to claim 13, characterised in that the first part (102) consists of a first layer of monocrystalline

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silicon, and in that the first and second parts (102) and (11) are integral with a same insulating layer 16 and in that the third part (15) consists of a second layer of silicon on which lies said insulating layer (16).

16. Electromechanical microstructure (1) according to one of claims 14 or 15, characterised in that the insulating layer (16) comprises a recess (18) situated immediately underneath the deformable zone (104).

17. Electromechanical microstructure (1) according to one of claims 1 to 7 or 10, characterised in that the first material constituting the mechanical part (102) is a doped semi-conductor and in that a doping of type opposite to that of the first material defines an electrode contact (19) at the surface of the mechanical part (102) outside of the exposed surface (2).

18. Electromechanical microstructure (1) according to one of claims 1 to 17, characterised in that the first organic film (4) is in a material such that the exposed surface (2) of the deformable zone 104 covered with this film (4) has biocompatibility, non cyctotoxicity and/or anti-adhesion or cellular anti-proliferation functions.

19. Electromechanical microstructure (1) according to one of claims 7 to 17, characterised in that the second film (7) is a film with biocompatibility and non-cyctotoxicity functions.

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20. Pressure sensor incorporating an electromechanical microstructure (1) according to one of claims 1 to 19.

21. Wafer (100) comprising a series of microstructures (1) according to one of claims 1 to 7 or according to claim 10, characterised in that it comprises a first shared electrode (106a) electrically connecting all of the mechanical parts (102) between them.

22. Wafer (100) comprising a series of microstructures (1) according to claim 8, characterised in that it comprises a first shared electrode (106b) electrically connecting all of the annular zones (5) between them and in that the polarity necessary to electro-initiate the first film (4) corresponds to the open sense of a diode created by the doping in the sense annular zone (5) towards deformable zone (104) of the mechanical part (102).

23. Wafer (100) comprising a series of microstructures (1) according to claim 8 or claim 11, characterised in that it comprises a first shared electrode (106a) electrically connecting all of the mechanical parts 102 between them and in that the polarity necessary to electro-initiate the second film (7) corresponds to the open sense of a diode created by the doping in the sense from the deformable zone (104) towards the annular zone (5) of the mechanical part (102).

24. Wafer (100) comprising a series of microstructures (1) according to claim 11, characterised in that it comprises a first shared

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electrode (106b) electrically connecting all of the annular zones (5) between them and in that the polarity necessary to electro-initiate the first and third films (4) and (10) is identical and corresponds to the open sense of the diode created by the doping in the sense annular zone 5 to the deformable zone (104) of the mechanical part (102).

25. Wafer (100) comprising a series of microstructures (1) according to one of claims 12 to 13, characterised in that it comprises a first shared electrode (106a) electrically connecting all of the mechanical parts (102) between them and a second shared electrode (106c) formed on the surface of the wafer (100) electrically connecting all of the second parts (11).

26. Wafer (100) comprising a series of microstructures (1) according to claim 17, characterised in that it comprises a first shared electrode (106d) electrically connecting all of the electrode pads (19) and in that the polarity necessary to electro-initiate the organic films (4), (7), (10) corresponds to the open sense of the diode created by the doping in the sense from the electrode contact (19) towards the mechanical part (102).

27. Microsystem (200) characterised in that it comprises an electromechanical microstructure (1) according to one of claims 1 to 6, electrically assembled with the front face turned round on an interconnection support (402) comprising an opening (405) facing the deformable part (104) of the microstructure (1).

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28. Microsystem (200) characterised in that it comprises an electromechanical microstructure (1) according to one of claims 7 to 9, electrically assembled with the front face turned round on an interconnection support (402) comprising an opening (405) facing the deformable zone (104) of the microstructure (1), the film (7) of the annular zone (5) of the microstructure (1) being in an insulating thermofusible material and coming into contact with a substrate (900) of the support (402) to form a sealing joint (1008) around the deformable zone (104) of the microstructure (1).

29. Microsystem (200) characterised in that it comprises an electromechanical microstructure (1) according to one of claims 10 to 13, electrically assembled with the front face turned round on an interconnection support (402) comprising an opening (405) leading out opposite the deformable zone (104) of the microstructure (1), the film (7) of the annular zone (5) of the microstructure (1) being in an insulating thermofusible material and coming into contact with a substrate (900) of the support (402) to form a sealing joint (7) around the deformable zone (104) of the microstructure (1), the film (10) or (14) of contact points (8) or (12) of the microstructure (1) being in a conductive thermofusible material and coming into contact with pads (908) of the support (402) to form a mechanical and electrical connection (10), (14) between the microstructure (1) and the support (402).

30. Microsystem (200) according to claim 29 characterised in that the contact points (908) of the

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support (402) comprises a film formed in a conductive thermofusible material obtained from an electro-initiated reaction, said covered pads coming into contact with films (10), (14) of the contact points (8), (12) of the microstructure (1) to ensure an electrical and mechanical connection between the support (402) and the microstructure (1) by heat sealing.

31. Microsystem (200) according to one of claims 28 to 30 characterised in that a substrate (900) of the support (402) comprises a film formed in a thermofusible insulating material obtained from an electro-initiated reaction, a part of the covered substrate (900) coming into contact with the film (7) of the annular zone (5) of the microstructure (1) to form a sealing joint (1008 around the deformable zone (104) of the microstructure (1) by heat sealing.

32. Microsystem (200) according to one of claims 27 to 31 characterised in that the support (402) is formed from a wafer in silicon, and in that it comprises a probe (902) connected to a dedicated electronic component (400) itself assembled on the support (402).